



## Social-Cognitive Predictors of College Student Use of Complementary and Alternative Medicine

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### ABSTRACT

**Background:** Little research has addressed the prevalence and predictors of complementary and alternative medicine (CAM) use among undergraduate students. **Purpose:** The purpose of this study was to: (1) measure the prevalence and type of CAM use among a sample of college undergraduates, and (2) test the significance of select social-cognitive constructs and demographics as predictors of CAM use among a college population. **Methods:** A random sample of undergraduate students within the Texas A&M University system was solicited via e-mail to complete a web-based survey. **Results:** Findings show high rates of CAM use. Gender, attitude toward CAM, outcome expectancies regarding the health care encounter, and social network use of CAM were shown to be significant predictors of CAM use. **Discussion:** CAM use is popular among college students. Results from this study can inform health care and health education professionals interested in improving health care processes and addressing positive and negative issues related to CAM use. **Translation to Health Education Practice:** Health educators should be prepared to present CAM as health care options and discuss benefits and risks associated with CAM therapies. Researchers should continue to explore the psychosocial determinants of CAM use as a guide for health education and intervention.

Complementary and alternative medicine (CAM) includes diverse medical systems and practices that are currently categorized into five main domains: (1) alternative health care systems, (2) mind-body interventions, (3) biologically based therapies, (4) manipulative and body-based methods, and (5) energy/biofield therapies (Figure 1).<sup>1-3</sup> Their link to each other is their inclusion or exclusion from conventional medical practices. In studies conducted within the past decade, approximately 67% of adults were found to have used at least one CAM therapy in their lifetimes, while approximately 40–42% had used CAM within the past year.<sup>4,5</sup> Research shows that with each generation, the likelihood and frequency of CAM use among U.S. adults continues to grow.<sup>6</sup> In 2000, the World Health Organization (WHO) estimated that 158 million American adults spent over \$17

billion on CAM practices.<sup>7</sup> This resurgence of CAM use and research around the world is attributed to a holistic consumer health movement emphasizing multifaceted treatment of the whole person, disenchantment with conventional medical services, and changing policies regarding CAM.<sup>8-11</sup>

As each generation continues to use more CAM practices, improved health education is needed to benefit and protect the American people. Health educators have the opportunity and responsibility to help people make appropriate health care and health promotion choices. Educators must be adequately prepared to present CAM therapies as viable options and to help communities learn skills to determine the risks and truths associated with different treatments.

As CAM use has increased, so has research regarding it and its users. Studies

show CAM users believe health care should concentrate on the whole person instead of just symptoms, and they perceive CAM therapies as more beneficial.<sup>12-16</sup> CAM users, especially younger people, have more positive attitudes toward CAM, which translate into greater enthusiasm and stronger intention to use CAM therapies.<sup>17-19</sup> The experience of others seems to increase the likelihood of CAM use, as CAM users have

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**Figure 1. CAM Therapies**

Alternative Medical Systems	
Acupuncture	Insertion of needles into body's pressure points to restore energy flow.
Ayurveda	Developed in India over 5,000 years ago. Treatment of body, mind, and spirit.
Homeopathy	Use of diluted natural substances to treat illness.
Naturopathy	Range of noninvasive CAM therapies used to restore body's ability to heal itself.
Biologically Based Therapies	
Chelation therapy	Binding agents injected into bloodstream to remove toxic metals and waste from body.
Diet-based therapies	Use of dietary changes to address health conditions.
Folk medicine	Cultural practices passed down from generation to generation.
Megavitamin therapy	Consumption of high volume of vitamins to prevent or treat a condition.
Nonvitamin, nonmineral supplements	Natural substances, such as herbs and botanicals, used to supplement diet.
Performance enhancers	Natural and/or synthetic substances used to enhance athletic performance.
Manipulative and Body-Based Therapies	
Chiropractic care	Manipulation of vertebrae and joints.
Massage	Manipulation of muscles and soft tissues.
Mind-Body Therapies	
Biofeedback	Use of electronic devices to train people to induce relaxation response.
Deep breathing	Slow and rhythmic breathing to induce relaxation.
Guided imagery	Visualization of desired outcome.
Hypnosis	State of relaxation and directed focus induced by professional.
Meditation	Process of suspending thoughts and inducing relaxed state.
Progressive relaxation	Progression of tensing and relaxing muscle groups.
Tai Chi	Originated in China. Slow and controlled series of movements.
Yoga	Series of poses combined with rhythmic breathing.
Energy/Biofield Therapies	
Energy healing/Reiki	Direction of subtle energy to heal and balance body's energy flow.
Qi Gong	Originated in ancient China. Involves movement, concentration, and breathing.

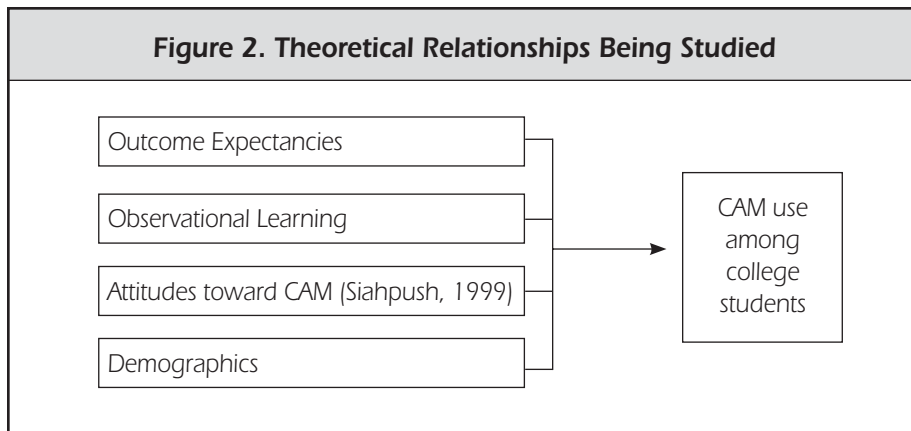
been shown significantly more likely to know someone who uses CAM or has received effective treatment.<sup>12,13,15</sup>

CAM studies have repeatedly demonstrated higher educational attainment as a consistently significant predictor of CAM use.<sup>4</sup> As such, college students are likely to be current or potential CAM users at a time when they are becoming increasingly responsible for their own health. In fact, college students have been shown to use CAM at rates higher than the general population.<sup>20,21</sup> However, measuring rates of use is not enough. Researchers have expressed the importance of understanding the reasons, especially psychosocial issues,

behind decisions to use CAM.<sup>5,22</sup> A handful of studies have begun to explore various aspects of attitude in relation to CAM and CAM use among college students.<sup>20,21,23</sup> Still, little is known about CAM use among college students and the possible factors influencing their decision to use CAM. In light of the growing use of CAM, research must explore needs among specific populations, such as American college students, who have a unique set of risky and unhealthy behaviors. It is important to accurately gauge their choices and understand why they choose particular health care options. Such results can provide a starting point for college health educators to successfully address

CAM use with their students.

The purpose of this study was to assess the level of CAM use among a selected sample of undergraduate students within the Texas A&M University system and determine significant predictors of use. Five research questions guided the study: (1) What is the reported CAM use among undergraduate students enrolled within the Texas A&M University system? (2) What is the relationship between perceived outcome expectancies and CAM use among the college population? (3) How is CAM use affected by observational learning? (4) What is the relationship between attitudes toward CAM and reported CAM use among these

**Figure 2. Theoretical Relationships Being Studied**

students? (5) Which demographic groups are more likely to use CAM?

This study was based on Bandura's Social Cognitive Theory (SCT), which is derived from the assumption that future behaviors are determined by an interaction of behavioral, personal, and environmental influences. SCT was selected for its applicability as a theoretical foundation for studying CAM use and predictors among the college population. It suggests a person will choose to perform an activity to minimize a negative outcome and maximize a positive one.<sup>24</sup> A review of the literature informed the inclusion of two SCT constructs—outcome expectancies and observational learning—as possible predictors of CAM use.

Outcome expectancies are the values an individual places on an outcome. It is believed that high expectancies regarding health care outcomes increase the likelihood of choosing those methods, while individuals with lower outcome expectancies will choose those methods less frequently or not at all. Observational learning relates to the impact of role models on a behavior. To be more precise: if people in a student's social network use CAM therapies, the student will be exposed to increased opportunities to observe the use of CAM and, perhaps, learn the behavior and use it him/herself.

One additional theoretical construct was assessed in this study: a scale of attitudes toward CAM used in a study involving an Australian population.<sup>16</sup> One limitation of this previous research was that it did not test the relationship of the attitude variable to actual CAM use. That relationship was

tested in the present study. In addition to the theoretical constructs, demographics were also assessed as possible predictors of CAM use. The relationships studied are shown in Figure 2.

## METHODS

This study employed a web-based survey to assess CAM use and its predictors among a random sample drawn from 70,000 undergraduate students in the Texas A&M system (TAMUS) campuses in Fall 2004. Approval was gained by the university's Institutional Review Board. Open access lists of student names and e-mail addresses were purchased from eight TAMUS schools. To maintain a 95% confidence interval and a 5% sampling error, a sample size of 383 respondents was needed.<sup>25</sup> Recruitment was based on Dillman's Tailored Design Method,<sup>25</sup> in which participants were solicited via a series of five contacts over a 27-day period. Solicited participants were contacted via e-mail and given a website link and generic passcode, which led to an information screen describing the study, their voluntary participation, the 18-year-old age requirement, and other human subjects information. Students selected an agree button to indicate their willingness to participate and were then provided access to the survey. To keep all responses anonymous, no identifying information was collected, no tracking system was used, and data was sent directly to a database.

## MEASURES

A systematic review of the literature was conducted to inform development of survey

items. The web-based survey was put online using a purchased software program and accompanying database entitled Survey-SelectASP Advanced version 8.0.2. It was reviewed by a voluntary panel of experts to ensure content validity. Reliability (or internal consistency based on Cronbach's alpha scores) and construct validity (based on exploratory factor analyses) were established (Table 1). Descriptive and inferential statistics were used to analyze the data with multiple regression as the primary analysis used to identify significant predictors of CAM use. All statistical analyses were done using SPSS version 12.0. Levels of significance were identified at  $p \leq .05$ ,  $p \leq .01$ , and  $p \leq .001$ .

## Dependent Variable

The dependent variable was use of CAM therapies. CAM use was defined as "at least once during the lifetime." This section collected use information on 33 types of CAM therapies (Table 2). To be able to compare to national trends, this section was based on variables used by the 2002 National Health Interview Survey (NHIS) with a few additional CAM types added.<sup>26</sup> Responses were coded (1="yes," 0="no" or "I don't know") to achieve an overall total score for use of CAM therapies. A score of zero meant the participant had not used any of the CAM therapies, while a score of 33 meant the participant had used each of the CAM therapies at least one time.

## Independent Variables

Participants were asked the question, "When you visit a health care provider, how important to you are each of the following outcomes?" They were then given a 5-point Likert-type scale for each outcome. Higher scores indicate expectancy values more in line with CAM philosophy. Eight statements were related to the health care encounter while three were related to personal issues of concern, improvement, and time. Run separately, the internal consistency of the eight treatment/provider outcome expectancies statements was .898, and that of the three personal outcome expectancies statements was .714. A Pearson correlation between the

**Table 1. Validity and Reliability of Scales**

Construct Validity	Number of Constructs	Variance Explained	Cronbach's Alpha
Outcome expectancies	2	56.10%	(a) initial: .91 (b) follow-up*: .897 (c) encounter: .898 (d) "outcome"**: .714
Attitude toward CAM	1	67.80%	0.877
Social network use of CAM	1	61.70%	0.875
n=345 *After 3 ambiguous statements removed ** Collinearity test using Pearson's correlation (.58) showed the two items are different and should be run as separate variables			

two factors was .58 ( $p < .000$ ), showing low collinearity. This meant the two factors were measuring different items, which suggested that they should be run as separate variables in the regression.

Attitudes toward CAM were measured using a scale designed by Siahpush,<sup>16</sup> in which participants were asked to rate their agreement with five statements on a 5-point Likert-type scale ranging from "strongly agree" to "strongly disagree." Three items were reverse scored for analysis. Higher scores were designed to indicate more positive attitudes toward CAM. Internal consistency was .877 ( $n=345$ ). Factor analysis showed items loading on one factor and accounting for 67.8% of the variance.

Observational learning was assessed by asking participants to indicate the people in their lives whom they believe to be CAM users. A higher score for observational learning means more groups of people in a participant's social network were known to be users of at least one CAM therapy. Internal consistency was .875 ( $n=338$ ). All items loaded on one factor, accounting for 61.7% of the variance.

Demographic variables such as gender, ethnicity, and school attended were assessed. Major fields of study were adopted from those used by TAMUS. Geographic locations were adopted from Barnes et al.<sup>26</sup>

## RESULTS

### *Characteristics of Respondents*

Of the 1,587 students who were asked to participate in the study, 399 responded to requests regarding the web-based survey. Surveys not completed in their entirety were excluded from analysis, resulting in 345 completed surveys (response rate of 21%). Respondents were similar to the population, with some differences. Higher percentages of females, White/non-Hispanic and American Indian/Alaskan Native, and upperclassman students responded to the survey than their counterparts (Table 3).

### *Prevalence of CAM Use*

When all variables were considered, over 98% of participants reported using at least one form of CAM in their lifetime (Table 2). Nearly half of the participants (44%) reported using between 1 and 5 therapies during their lifetime, while 41.2% reported using 6-10 and 13.1% reported using more than 10. The most common therapies used were massage (53.9%), deep breathing exercises (35.9%), yoga (28.7%), chiropractic (26.4%), and meditation (22.0%). As far as supplements, nonvitamin, nonmineral (NVNM) supplements were most commonly used (44.1%), followed by megavitamins (22.0%) and performance enhancers (16.8%). Over 30% of participants reported

dieting at some point in their lifetimes, and the Atkins diet was reported almost twice as often as the next closest diet. For lifetime use, Atkins was reported by 20.3% of participants, followed by vegetarianism (10.4%) and the South Beach diet (8.1%). Eighty-two percent of participants reported use of prayer for health reasons in their lifetimes. High rates of use were reported for prayer for own health (77.4%), others praying for one's health (68.1%), and group prayer (57.7%). Eighty-seven percent reported exercising during their lifetime to benefit their health.

### *Attitudes toward CAM*

For attitudes toward CAM, the mode score for each item was three, meaning most respondents were neutral (did not disagree or agree) with the statements. The overall attitude toward CAM was slightly negative, with a mean score of 2.84 (Table 4). Thirty-one percent of respondents believed alternative therapists are "quacks," while over a quarter believed most alternative therapies do not work. Almost 40% would not recommend alternative therapy to a friend, and nearly 37% reported they would not trust an alternative therapist. In contrast, almost 14% reported trust in an alternative therapist, over 17% believed in the abilities of alternative therapists, nearly 22% believed CAM therapies do work, and



**Table 2. Sample Comparison with Barnes et al.**

Variables Included in Definition of CAM Use	Current Sample %	Barnes et al. %
All (n=33)	98.3	—
Prayer excluded (n=29)	96.2	—
Exercise excluded (n=32)	95.4	74.6
Prayer and exercise excluded (n=28)	83.8	—
<b>Alternative Medical Systems</b>		
Acupuncture	2.6	4.0
Ayurveda	0	0.4
Homeopathy	7.2	3.6
Naturopathy	4.3	0.9
<b>Biologically Based Therapies</b>		
Chelation	0	0.1
Folk medicine	9.9	0.7
Nonvitamin, nonmineral products	44.1	25.0
Diet-based therapies	30.7	6.8
Vegetarianism	10.4	2.6
Macrobiotics	0.6	0.7
Atkins	20.3	3.6
Pritikin	0.6	0.3
Ornish	0.6	0.1
Zone	3.8	0.5
South Beach	8.1	—
Megavitamins	22.0	3.9
Performance enhancers	16.8	—
<b>Manipulative and Body-Based Therapies</b>		
Chiropractic	26.4	19.9
Massage	53.9	9.3
<b>Mind-Body Therapies</b>		
Biofeedback	3.8	1.0
Meditation	22.0	10.2
Guided imagery	9.6	3.0
Progressive relaxation	13.0	4.2
Deep breathing exercises	35.9	14.6
Hypnosis	4.3	1.8
Yoga	28.7	7.5
Tai Chi	4.9	2.5
All Prayer	82.6	55.3
Prayed for own health	77.4	52.1
Others prayed for your health	68.1	31.3
Group prayer	57.7	23.0
Healing ritual	7.8	4.6
<b>Energy/Biofield Therapies</b>		
Qi Gong	0.9	0.5
Healing therapy/Reiki	2.0	1.1

16.5% would recommend CAM to a friend. Even with the overall attitudes skewed to the negative, over 35% disagreed and over 41% remained neutral toward the statement they would never use the services of an alternative therapist.

### **Observational Learning**

Observational learning assessed the number of social groups that respondents reported as users of CAM (Table 5). Over 45% of respondents reported friends as CAM users, while parents, grandparents, other relatives, and other people in their social circles were reported as CAM users by 35, 31, 36, and 37% of participants, respectively. Over 30% reported not knowing any users of CAM in the six social network groups. Most participants indicated knowing CAM users in at least one and up to four different social network groups. Almost 5% reported knowing CAM users in each of the six categories.

### **Outcome Expectancies**

The undergraduate participants reported high outcome expectancy scores related to their health care encounter (Table 6) and personal values (Table 7). Highest mean scores (>4.5) arose for statements regarding risks being explained in a clear and understandable manner, support of overall health, and improvement in the individual's situation. The lowest mean scores had to do with statements regarding monetary cost (mean=3.97) and concerns being effectively addressed by the health care provider (mean=3.67). Means, standard deviations, ranges, and theoretical midpoints for all scales are provided in Table 8.

### **Predictors of CAM Use**

Correlation coefficients between the variables included in the regression are shown in Table 9. All associations are significantly different than zero but small in magnitude, which means low multicollinearity between variables. Regression was run on each variable to determine its significance without accounting for other variables. Linear regression was used to determine how the four theoretical construct variables behaved together in predicting CAM use. Attitude



toward CAM ( $p<.001$ ), social network use ( $p<.001$ ), and encounter outcome expectancies ( $p<.01$ ) were significant contributors when only those three variables were in the model. Once the personal outcome expectancies variable was added, neither outcome expectancies variable was significant.

Hierarchical regression was used to determine how variables would react once demographics were accounted for. After demographics were entered, theoretical constructs were added in the following order: attitude toward CAM, social network use, encounter outcome expectancies, and personal outcome expectancies. The final model accounted for over 33% of the variance (Figure 3). Being female ( $p<.01$ ), not being a freshman ( $p<.001$ ), having a positive attitude toward CAM ( $p<.001$ ), and knowing people who use CAM ( $p<.001$ ) were significant predictors of CAM use. Encounter outcome expectancies were significant ( $p<.05$ ) until personal outcome expectancies were added to the model. The strongest contributors were social network use ( $\beta=.293$ ) and attitude toward CAM ( $\beta=.236$ ).

## DISCUSSION

The purpose of this study was to assess the level of CAM use among a random sample of TAMUS undergraduate students and determine significant predictors of use. Findings provide an understanding of the health attitudes of a selected group of university students and present a facet of this population which has not yet been studied in this way. By increasing awareness and understanding of CAM use and its influences among university undergraduate students, health educators can take an active role in the changing trends of health care in America.

CAM use is prevalent among TAMUS students at rates higher than those of the general adult U.S. population. Gender, undergraduate classification, attitude toward CAM, social network use, and encounter outcome expectancies are all significant predictors of CAM use among this population. Females with senior classification who have positive attitudes toward CAM, know

**Table 3. Comparison of Respondent and Population Characteristics**

Variable	Sample %	Population %
<b>Gender</b>		
Male	35.7	47.4
Female	64.3	52.6
<b>Ethnicity</b>		
White/Non-Hispanic	77.7	62.9
Hispanic	12.8	17.1
Black/Non-Hispanic	3.5	11.4
Asian or Pacific Islander	1.7	1.9
American Indian or Alaskan Native	1.2	0.6
Non-resident alien or foreign national	0.6	5.5
Other/unknown	2.6	0.5
<b>School</b>		
Texas A&M University	66.1	50.1
Prairie View A&M University	3.2	8.7
Tarleton State University	4.3	9.9
Texas A&M University @ Galveston	2.6	1.8
Texas A&M University-Kingsville	5.5	7.7
Texas A&M International University	2.3	4.6
West Texas A&M University	8.4	7.9
Texas A&M University-Commerce	7.5	9.3
<b>Classification</b>		
Freshman	19.4	25.6
Sophomore	20.3	19.9
Junior	25.2	23.5
Senior	33.6	31.0
Unknown	1.5	0.0

others who use CAM, and value outcomes in line with the CAM philosophy are more likely to be users of CAM. At the time this data was collected, no unit on CAM was offered on the main campus of Texas A&M University, and it is unknown whether the satellite campuses had any related requirements. A CAM unit has since been added to a basic health course required for all students on the main campus before graduation. It is likely this will influence future attitudes, expectancies, and behavioral learning related to CAM. A repeat of this data collection at regular intervals will be needed to keep current with these changes as CAM-related curricula develop and as teachers and students become more knowledgeable.

The results of this study echo previous research regarding the higher prevalence of CAM use among college students compared

to the general population (Table 2). Using variables in the CAM definition comparable to those used by Barnes et al., over 95% of the undergraduate students in this sample reported using CAM at least once.<sup>26</sup> This is higher than the 67.6–75% of U.S. adults who reported using at least one CAM therapy in prior national studies.<sup>6,26</sup> The overall rate of CAM use reported in each sample is likely influenced by the number of CAM therapies assessed in each study. However, major differences were found in use of specific CAM treatments—for diet-based therapies, megavitamins, massage, and several of the mind-body therapies, the college sample reported rates of use several times greater than Barnes et al.'s population. Among the college students in this study, the five most common therapies used were prayer (82.6%), massage (53.9%), NVNM (44.1%), deep breathing

**Table 4. Means, Standard Deviations, and Percentages of Responses for Attitude Toward CAM**

	Range 1-5 Mean	SD	% Who Strongly Agree 5	% Who Agree 4	% Unsure 3	% Who Disagree 2	% Who Strongly Disagree 1
I think most alternative therapists are quacks.*	3.22	0.856	9.0	22.0	51.6	16.2	0.9
I think most alternative therapies do not work.*	3.10	0.826	6.4	20.0	51.6	21.2	0.6
I would never use the therapies of an alternative therapist.*	2.85	0.977	5.5	17.1	41.4	28.7	6.7
I would recommend alternative medicine to any one of my friends who might get ill.	2.72	0.915	3.2	13.3	44.1	31.0	7.8
I trust most alternative therapists.	2.68	0.848	0.9	12.8	49.0	28.1	8.7

\*Reverse score used for items 1, 2, and 3 in factor analysis and regression.

exercises (35.9%), and diet-based therapies (30.7%). Almost one-third of college students reported use of diet-based therapies compared to only 6.8% of the general adult population. Similar to Barnes et al.'s respondents, this college sample reported using practitioner-based therapies less often than therapies not requiring an expert or health care provider. The college sample seems much more involved with issues of image or weight loss with use of NVNM and diet-based therapies. Use of prayer for health reasons was also reported by many study participants.

In this study, two new scales measuring outcome expectancies in relation to health care were developed, and the data was tested for reliability and validity. The encounter outcome expectancies scale assessed how important participants believed aspects of the patient-provider relationship, treatment, and personal outcomes to be. Participants reported strong expectancy scores relating to expectations they have of health care providers and treatment. They expect their health situation to be improved by any treatment provided, expect risks to be minimal and explained clearly, and expect the visit to be worth the monetary cost. College students surveyed expect health care providers to support their overall health, spend ad-

equating time with them, respect their health care beliefs, and look beyond their illness. Participants who reported higher outcome expectancy scores related to the health care encounter were significantly more likely to be CAM users. This variable did not hold its significance, however, once personal outcome expectancies were added to the model. Participants felt personal outcome expectancies (i.e., immediate improvement, concerns being effectively addressed, and visits being worth the time) were important but not as important as the encounter outcome expectancies. Although participants expect improvement from treatments (as indicated in the encounter outcome expectancies), they do not expect immediate improvement. The participants in this study valued their time devoted to a health care appointment slightly more than they valued the cost of the appointment. And while participants reported fairly high scores for personal outcome expectancies, this scale was not a significant predictor of CAM use in this sample.

Use of CAM by members of a participant's social network was shown to be a highly significant predictor of CAM use. The majority (70%) of participants reported knowing at least one other person who is a CAM user, and most knew multiple friends,

family, etc. who are CAM users. Over 45% of respondents reported having friends who are CAM users, and 31-37% reported having parents, grandparents, other relatives, and other people in their social network who use CAM.

The data generated by the attitude toward CAM scale was highly valid and reliable for use among this population. The large amount of neutral responses shows many students in this population are unsure of their beliefs regarding CAM. This could be due to a lack of knowledge regarding CAM and a feeling of low efficacy in reporting strongly one way or another. While the overall attitude was slightly negative, attitude toward CAM is a strong predictor of CAM use in this population. Participants who reported more positive attitudes toward CAM were significantly more likely to be CAM users. While other studies demonstrated that bad experiences, negative attitudes, and dissatisfaction with conventional medicine were not significant predictors of CAM use, they did not explore how attitudes toward CAM predict CAM use.<sup>4,27</sup>

Further research is needed on psychosocial determinants of CAM use.<sup>22,28</sup> Specifically, research on attitudes and social network use among other populations and college samples should be conducted to



confirm the findings of this study. Use of additional theories or theoretical constructs to guide research would confirm the usefulness of current theories for understanding CAM use and provide foundation for the development of new theories better suited to such research. Research regarding social marketing, effective marketing materials, and media influence on CAM use would provide another interesting and necessary component for understanding CAM use among Americans.

Questions regarding CAM use, practitioner involvement, and attitude toward CAM need to be addressed in greater depth among this population. As data on practitioner usage was not gathered in this study, it cannot be shown whether use of CAM therapies involved the guidance of a practitioner or was implemented as a form of self-care. In addition, future research can explore how attitude toward CAM influences the decision to involve a practitioner or to practice CAM without professional guidance. For example, in this study, 31% of participants reported believing alternative therapists to be quacks. It should be explored whether this 31% would still use CAM without a practitioner. In another example, 40% reported they would not recommend CAM to a friend. Future research can address why these students would not recommend CAM and whether they themselves would still use it (even if they wouldn't recommend it).

Further research might also test whether outcome expectancies expressed by participants toward health care providers also might be inferred to health educators. This study showed college students' outcome expectancies to align with the CAM philosophy even though conventional health care is the dominant force in our society. Research questions might explore how the health education values we express in our health education classrooms align with conventional health care or with the CAM expectancies shared by college students. It is not too farfetched to speculate that students expect their health to be improved after taking a health course, expect things to be explained clearly, and expect the course to

Table 5. Percentage of Respondents Reporting CAM Use Among Social Network Groups		
Social Network Groups	% Yes	% No/Unsure
Parents	35.1	64.9
Grandparents	30.1	69.9
Other relatives	35.7	64.3
Friends	45.8	54.2
Coworkers	17.7	82.3
Other people you know	37.1	62.9

be worth the time and money it cost. Perhaps today's college students expect health educators to support their overall health, spend adequate time with them, respect their health care beliefs, and look beyond health in terms of illness.

#### Limitations

This study used self-reported data from anonymous, self-selected participants. The randomly selected sample was drawn from eight TAMUS schools. Due to privacy laws, personal information was not available for nonrespondents and made comparison to respondents impossible. This may limit the generalizability of study findings. Students were contacted via e-mail, and the web-based survey was the only method of data collection. Many of the solicitation e-mails were returned as undeliverable. In addition, some students perceived the solicitations as junk mail, while others may have used other e-mail accounts rather than their university accounts.

#### TRANSLATION TO HEALTH EDUCATION PRACTICE

Today's college students have high expectations of health care and are continuing the trend of increased CAM use in America. While many students report use of therapies, diets, prayer, and other practices for health reasons, as well as high expectancies regarding outcomes, they are often unsure of their beliefs and slightly negative in their attitudes regarding CAM. Many of the CAM practices they use most commonly, such as supple-

ments, diets, prayer, exercise, deep breathing, and yoga, are not practitioner-based and are most likely being conducted without professional guidance. Health educators should be prepared to present all health care options, their benefits, and the general risks associated with them.

The development of effective health information regarding CAM can be a start. To be effective, new or existing courses, programs, and resources should be evidence-based, referenced, up-to-date, free from commercial bias, reviewed by experts, decision focused, and user friendly.<sup>29</sup> Based on evidence demonstrating rates of use, questionable CAM choices, and reasons for CAM use, educational opportunities need to be addressed. In the classroom, this might include enhancing curricula with units on CAM and health care options, having guest speakers who have had experience as CAM providers or patients, using technology (video or internet) to expose students to CAM therapies, and facilitating assignments and/or activities in which students can research or discuss CAM. Campus health services can examine their current health education lecture, website, and print material offerings. Surveys can be administered at each university or college to determine the educational needs of its particular students regarding CAM. In-services for conventional health care providers and health educators can introduce or enhance their comfort level with CAM topics so they are prepared to respond adequately to patients. Health



**Table 6. Means, Standard Deviations, and Percentages for Encounter Outcome Expectancies**

	Range 1-5		Very Important 5	Important 4	Unsure 3	Unimportant 2	Very Unimportant 1
	Mean	SD					
The health care provider seems to support my overall health.	4.55	0.722	62.9	32.5	3.2	0.6	–
Following the advice of my health care provider will improve my situation.	4.51	0.712	59.4	34.2	5.2	0.6	0.6
The health care provider spends adequate time with me.	4.40	0.764	52.2	38.8	7.0	1.4	–
I believe the health care provider will support me beyond my illness.	4.41	0.820	23.6	38.6	5.5	0.9	0.3
The health care provider respects my health care beliefs.	4.14	0.978	42.9	36.2	16.5	1.4	2.0
Risks associated with the treatment are minimal.	4.45	0.722	53.3	41.4	4.1	0.3	–
Risks are explained to me in a clear and understandable way.	4.58	0.796	68.4	26.4	3.2	0.6	–
The visit is worth the monetary cost.	3.97	0.957	32.5	40.6	21.7	5.2	2.0

**Table 7. Means, Standard Deviations, and Percentages for Personal Outcome Expectancies Scale**

	Range 1-5		Very Important 5	Important 4	Unsure 3	Unimportant 2	Very Unimportant 1
	Mean	SD					
Concerns are effectively addressed by the health care provider.	3.67	0.946	19.4	39.1	33.6	5.5	1.7
I experience immediate improvement in problems.	4.18	0.746	35.1	50.4	13.0	0.9	0.3
The visit is worth the time spent planning it, getting to it, waiting for it, and having it.	4.03	0.894	31.3	46.4	18.8	1.2	1.7

**Table 8. Means, Standard Deviations, Ranges, and Theoretical Midpoints of Variables**

Variables	n=345	Scale Mean	SD	Range	Theoretical Midpoint
Lifetime Use		6.55	3.93	0-33	16.5
Attitude Toward CAM		16.43	4.32	5-25	15
Social Network Use of CAM		2.01	1.85	0-6	3
Encounter Outcome Expectancies		39.13	1.18	34-41	37.5
Personal Outcome Expectancies		11.92	1.97	3-15	9

service, health education, and health promotion centers might want to consider offering CAM services now or in the future.

Consumer choice of health care is an ever-changing continuum of variety, and

health educators should be at the forefront of this change.<sup>30</sup> CAM users have values that align with the philosophies of CAM therapies. They value choice, proactive involvement, and health-promoting behaviors.

In a school or community health education setting, health educators can be prepared to provide the information and guidance that consumers require now and in the future. Health educators are critical for helping



Table 9. Correlations Between Variables

	D2	P1	P2	P3
Variables	Lifetime Use	Encounter Outcome Expectancies	Personal Outcome Expectancies	Attitude Toward CAM
P1 Encounter Outcome Expectancies	.200***			
P2 Personal Outcome Expectancies	.209***	.532***		
P3 Attitude Toward CAM	.346***	.156***	.118*	
P4 Social Network Use	.361***	.080***	.147**	.245***

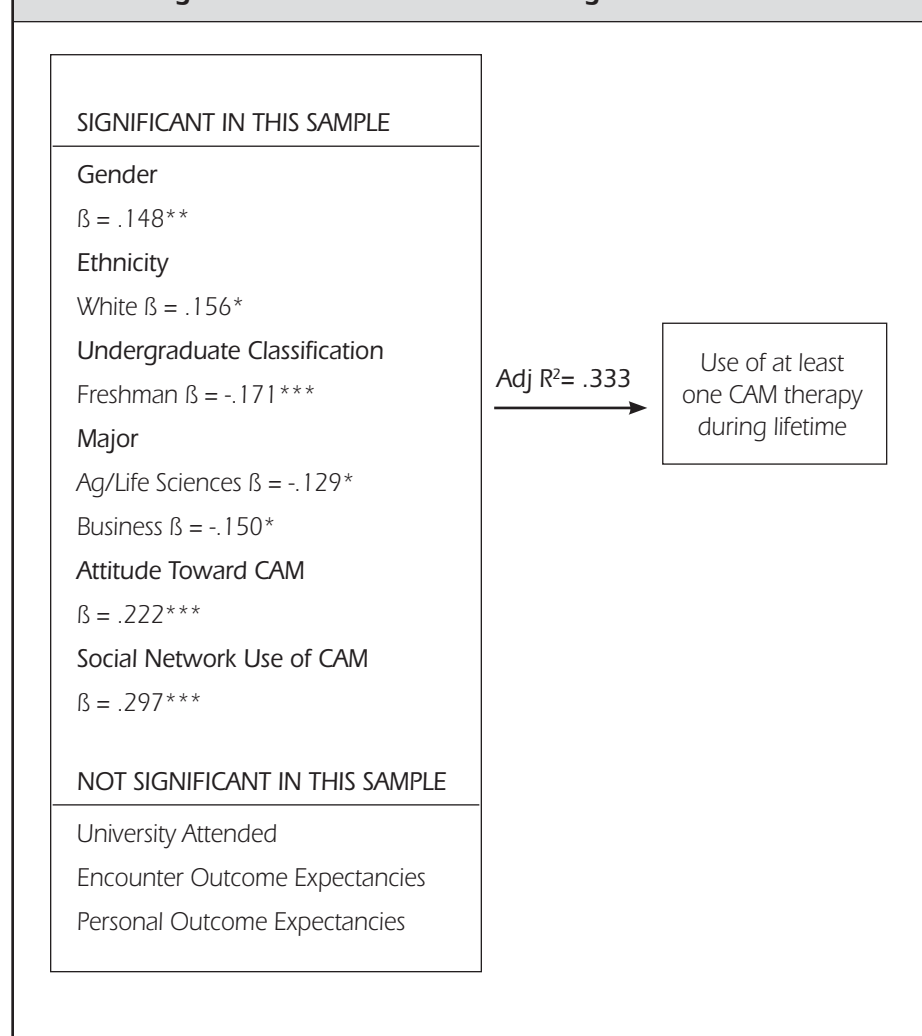
\*p<.05  
 \*\*p<.01  
 \*\*\*p<.001  
 D1-D2=Dependent Variable  
 P1-P4=Predictor Variables

consumers make sense of the complex range of health care choices.<sup>10</sup>

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Figure 3. Model of Hierarchical Regression Results





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